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RESEARCH MEMORANDUM

AN ANALYSIS OF MARINE CORPS ENLISTED DEPENDENCY RATES

Peter F. Kostiuk

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REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified		1b. RESTRICTIVE MARKINGS			
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.			
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) CRM 86-198		5. MONITORING ORGANIZATION REPORT NUMBER(S)			
6a. NAME OF PERFORMING ORGANIZATION Center for Naval Analyses	6b. OFFICE SYMBOL (If applicable) CNA	7a. NAME OF MONITORING ORGANIZATION Commandant of the Marine Corps (Code RDS)			
6c. ADDRESS (City, State, and ZIP Code) 4401 Ford Avenue Alexandria, Virginia 22302-0268		7b. ADDRESS (City, State, and ZIP Code) Headquarters, Marine Corps Washington, D.C. 20380			
8a. NAME OF FUNDING / ORGANIZATION Office of Naval Research	8b. OFFICE SYMBOL (If applicable) ONR	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N00014-83-C-0725			
8c. ADDRESS (City, State, and ZIP Code) 800 North Quincy Street Arlington, Virginia 22217		10. SOURCE OF FUNDING NUMBERS			

PROGRAM ELEMENT NO. 65153M	PROJECT NO C0031	TASK NO	WORK UNIT ACCESSION NO

11. TITLE (Include Security Classification)

An Analysis of Marine Corps Enlisted Dependency Rates

12. PERSONAL AUTHOR(S)
Peter F. Kostiuk

13a. TYPE OF REPORT Final	13b. TIME COVERED FROM TO	14. DATE OF REPORT (Year, Month, Day) September 1986	15. PAGE COUNT 32

16. SUPPLEMENTARY NOTATION

17. COSATI CODES

FIELD	GROUP	SUB-GROUP
05	09	
12	01	

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

Age, Demography, Enlisted personnel, Income, Marine Corps personnel, Military dependents, Pay, Regression analysis, Statistical analysis, Statistical data

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This research memorandum develops a model for predicting Marine enlisted dependency rates by pay grade. It estimates the effects of economic and demographic factors and provides monthly forecasts through fiscal year 1990.

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Lt.Col. G. W. Russell	22b. TELEPHONE (Include Area Code) (202) 694-3491	22c OFFICE SYMBOL RDS-40

25 September 1986

MEMORANDUM FOR DISTRIBUTION LIST

Subj: Center for Naval Analyses Research Memorandum 86-198

Encl: (1) CNA Research Memorandum 86-198, "An Analysis of Marine Corps Enlisted Dependency Rates," by Peter F. Kostiuk, September 1986

1. This Research Memorandum represents the final documentation of the Dependency Rate Projection Study requested by the Manpower Plans and Policy Division of Headquarters, Marine Corps. It analyzes the factors that have led to increases in the dependency rates of Marine Corps enlisted personnel. The analysis provides estimates of future dependency rates, and is available for use on a microcomputer.

2. Enclosure (1) is forwarded as a matter of possible interest.

Christopher Jehn
Director
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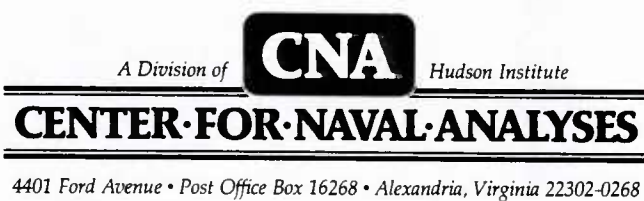FT1   CNET
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AN ANALYSIS
OF MARINE CORPS ENLISTED
DEPENDENCY RATES

Peter F. Kostiuk

Marine Corps Operations Analysis Group

ABSTRACT

This research memorandum develops a model for predicting Marine enlisted dependency rates by pay grade. It estimates the effects of economic and demographic factors and provides monthly forecasts through fiscal year 1990.

EXECUTIVE SUMMARY

This research memorandum examines the factors influencing the level of dependency rates for Marine Corps enlisted personnel. The dependency rate is the percentage of enlisted Marines having at least one dependent. Monthly data from October 1977 through June 1986 are used to determine how factors such as pay grade, age, and military pay affect dependency rates. The impact of Marine Corps policy changes is also evaluated.

The study concludes that changes in military pay and in the age distribution of the enlisted force are the major factors causing fluctuations in dependency rates. Age is an important determinant of dependency because of its high correlation with the probability of being married. High reenlistment rates during the past few years have raised the average age within the Marine Corps. The result is more older Marines with higher rates of dependency.

Even controlling for age, dependency rates have been rising. Part of this rise is due to changes in military pay and allowances. The high rates of dependency now prevalent are actually a return to the more typical rates characteristic of the mid-1970s. The low dependency rates of 1979 and 1980 resulted primarily from the severe erosion of military pay, which reduced the enlisted Marine's ability to marry and have a family.

In some pay grades (primarily E-2 through E-4), there is an additional upward time trend in dependency rates after controlling for age and pay. This trend is unrelated to demographic characteristics and is generally in the opposite direction from the movement of civilian rates. The magnitude of this trend varies from pay grade to pay grade but is still statistically significant. For pay grades E-5 and E-6, the trend is decreasing.

The model developed in this study can be used to predict dependency rates for the next several years. Predicted dependency rates by pay grade for fiscal years 1987 to 1989 are shown in table I. The predictions are based on the following assumptions:

- Military pay and allowances, adjusted for inflation, will be unchanged from current levels.

- The average age within each pay grade will continue to change at the rates experienced during the last 8 years.

- The underlying time trend in dependency rates, after accounting for age and pay, will be the same as estimated during the last 8 years.

If any of these assumptions change, the predictions must be adjusted accordingly.

TABLE I

PREDICTED DEPENDENCY RATES FOR FY 1987-1989
(Percent)

Pay grade	Current rate	Predicted dependency rate		
		1987	1988	1989
E-1	5.67	5.78	5.93	6.08
E-2	9.20	9.46	9.81	10.17
E-3	24.80	25.40	26.24	·27.08
E-4	46.38	47.78	49.75	51.72
E-5	72.62	73.79	75.43	77.08
E-6	88.34	88.40	88.47	88 55
E-7	95.09	95.09	95.09	95.09
E-8	96.56	96.56	96.56	96.56
E-9	97.13	97.13	97.13	97.13

The model can easily be changed in response to different parameter estimates or to accommodate various predictions about future changes in pay and average age. The model is available for use on a microcomputer.

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INTRODUCTION

This research memorandum presents updated projections of Marine Corps enlisted dependency rates. The dependency rate is the percentage of enlisted Marines with dependents. Building on the findings of previous research by the Center for Naval Analyses (CNA),[1] the analysis incorporates the effects of changes in pay and the age distribution of Marines to extrapolate current trends for several years into the future. This analysis improves on the earlier research by using more and better data, as well as superior methods for projecting changes in the average age of Marines within pay grades.

Since 1980, enlisted dependency rates have risen steadily and are now at the highest levels of the last 10 years. Previous research indicated that changes in pay and the average age of Marines could explain much of the rise in dependency; however, recent data show dependency rates rising more rapidly than predicted. Using these data, the original model was modified to include a time trend designed to capture the upward movement in dependency rates that is independent of changes in pay and age. The estimation procedure was also adjusted to correct for autocorrelation in the time series of dependency rates.

Projections of dependency rates are critical for accurately predicting budget requirements because Marines with dependents receive a higher basic allowance for quarters (BAQ). The increasing number of dependents also affects areas such as housing requirements, recreational and medical facilities, and family assistance programs. More accurate dependency-rate projections may significantly improve the ability of the Marine Corps to plan for future budget requirements in the area of personnel allowances and military construction.

In recent years, the Marine Corps has experienced a significant rise in the dependency rate. Figure 1 shows the percentage of Marines with dependents from 1978 to 1985. Of particular interest is the bowed shape of the graph, with the lowest rate of dependency occurring in 1980. Since that time, the rate has risen steadily, with recent rates exceeding those for 1978.

The aggregate Marine Corps dependency rates shown in figure 1 obscure the underlying factors that influence the level of dependency. Changes in the

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1. CNA, Research Memorandum 85-25, *Determinants of Dependency Rates for Marine Corps Enlisted Personnel*, by Peter F. Kostiuk, May 1985.

age distribution of Marines, for example, have an important effect on the aggregate dependency rate, because older Marines are more likely to be married. In addition, high reenlistment rates result in a higher grade structure, which may, in turn, increase dependency rates.
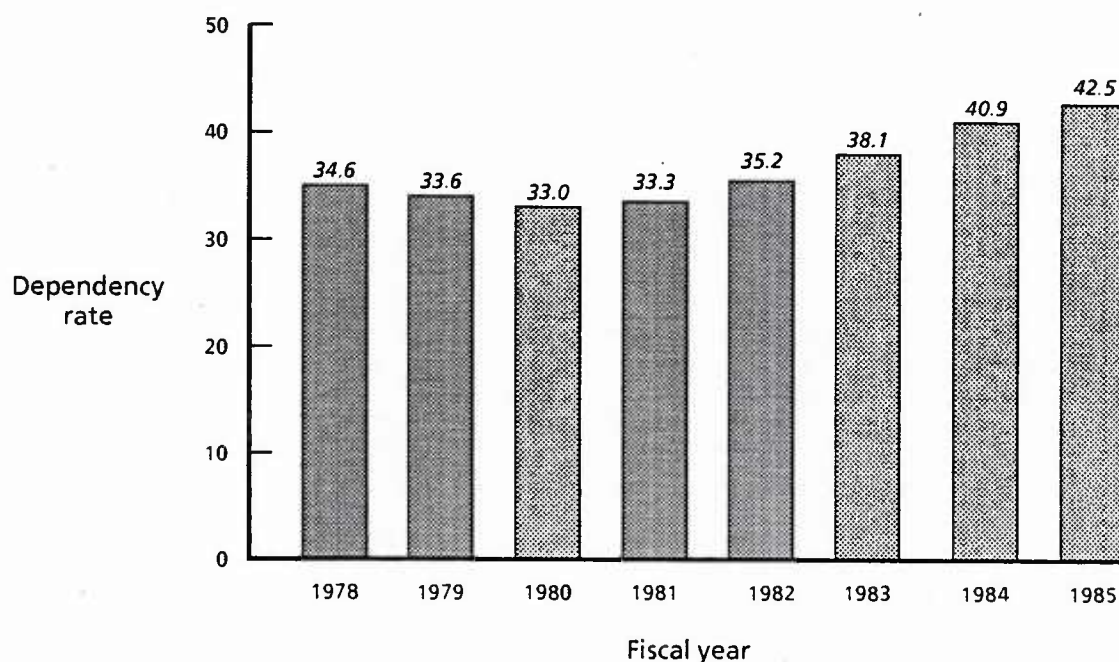

FIG. 1: AGGREGATE DEPENDENCY RATES FOR ENLISTED MARINES

Two additional factors that may have affected enlisted dependency rates are demographic trends and Marine Corps policy changes. If marriage rates are rising in the United States, it is likely that the pattern for Marines is similar. Recent Marine Corps policy changes, such as those implemented in the Unit Deployment Program (UDP), may have made family life more attractive for Marines by reducing both uncertainty and time spent overseas. Combined with additional base housing overseas, such policies may have made marriage more desirable for Marines by increasing the stability of family life.

Each of the factors mentioned above could have contributed to the rise in Marine dependency rates. This analysis will address each in turn and determine the degree of influence on the aggregate dependency rate. Other possible explanations will also be examined.

FACTORS INFLUENCING DEPENDENCY RATES

The dependency rate is comprised of several different factors, of which marital status is the most important. Table 1 shows a breakdown of the dependency rate into three components: the presence of a spouse, dependent child, or dependent parent. It is clear that marital status is by far the largest component and also exhibits a sharp rise during the last several years. The other two components are relatively stable during the same time period. More importantly, fluctuations in marital status most closely resemble those in the aggregate dependency rate. The rise in the rate for dependent children has been steady, so that the curve does not exhibit the bowed shape characteristic of the overall rate. The fluctuation in the rate for dependent parents is far too small to have a significant effect. For these reasons, the analysis focuses on marital status as the prime determinant of dependency rates.

TABLE 1

COMPONENTS OF DEPENDENCY RATE

Fiscal year	Child	Parent	Spouse	Dependency rate[a]
1977	1.6	0.1	32.9	34.7
1978	1.8	0.2	31.5	33.5
1979	1.9	0.2	30.4	32.5
1980	2.1	0.1	30.2	32.4
1981	2.3	0.1	30.5	32.9
1982	2.5	0.2	32.4	35.1
1983	2.6	0.2	35.5	38.2
1984	2.6	0.2	37.7	40.5
1985	2.7	0.2	39.1	42.1

a. Component rates do not always sum to total because of rounding.

Part of the rise in dependency from 1980 to 1985 — about 26 percent — can be attributed to a higher grade structure. Table 2 shows the percentage of enlisted Marines in each pay grade in fiscal years 1980 and 1985. There are now lower percentages of Marines in grades E-1 and E-2, with correspondingly higher proportions in grades E-3 through E-8. This raises the overall dependency rate because individuals in higher grades are more likely to have dependents. Other factors must be operating, however, because there is also a rising trend within grades since 1980.

TABLE 2

ENLISTED GRADE STRUCTURE

Grade	Enlisted personnel in pay grade (percent)[a]	
	1980	1985
E-1	12.96	7.53
E-2	16.19	13.81
E-3	25.72	29.36
E-4	15.88	18.72
E-5	13.95	14.18
E-6	7.67	8.74
E-7	5.04	5.22
E-8	1.84	2.12
E-9	.75	.74

a. Component rates do not always sum to total because of rounding.

Figure 2 demonstrates this common pattern in dependency rates for all pay grades. The trend over time is gradually rising, with the lowest rates occurring around 1980. The shape of the curves brings up an interesting question: Which rates are unusual—the relatively high dependency rates of the last few years or the low rates from 1979 to 1981? That rates are now higher than ever before might indicate some new trend; but, in fact, figure 2 is slightly misleading. The aging of the force in recent years has created not only a higher grade structure but also a higher average age within grades. Figure 3 shows dependency rates for enlisted Marines by age group. The curves have a distinct bow shape, and current rates are actually lower than in 1976.

The effect of changes in the age distribution on dependency can be seen by examining figure 4, which shows average dependency rates for Marines age 17 to 25 during the last 9 fiscal years. Relatively small differences in age have a strong impact on the dependency rate. For example, the rate for 23-year-old Marines is 11.2 percentage points higher than that for 22-year-olds. Of course, if the age distribution remains constant, dependency rates will not change. However, the average age of Marines has been increasing since 1977. Figure 5 shows the pronounced upward trend in average age for the most common pay grades. There is no evidence that the

trend has reached its peak, and high reenlistment rates will continue to push up the average age of Marines in these pay grades.
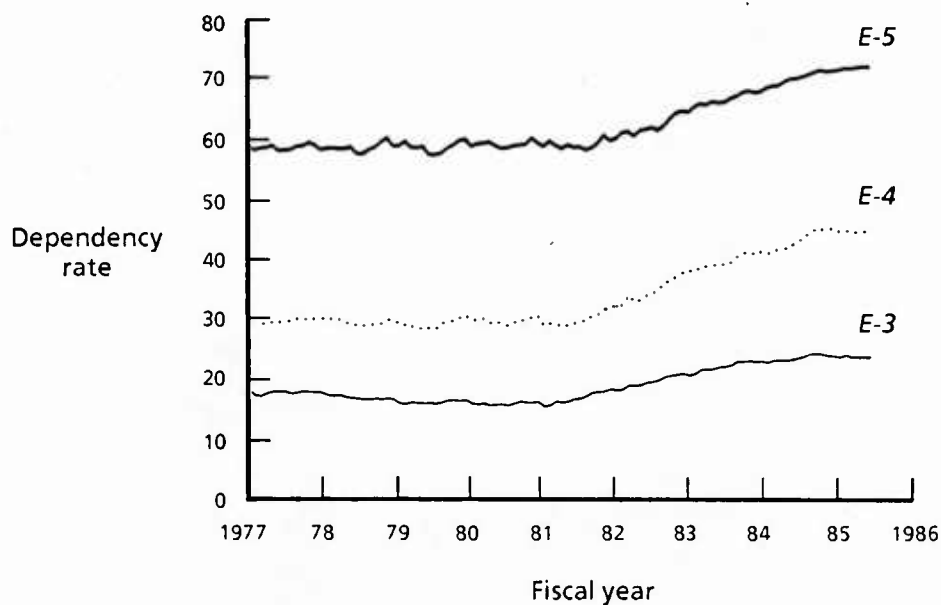
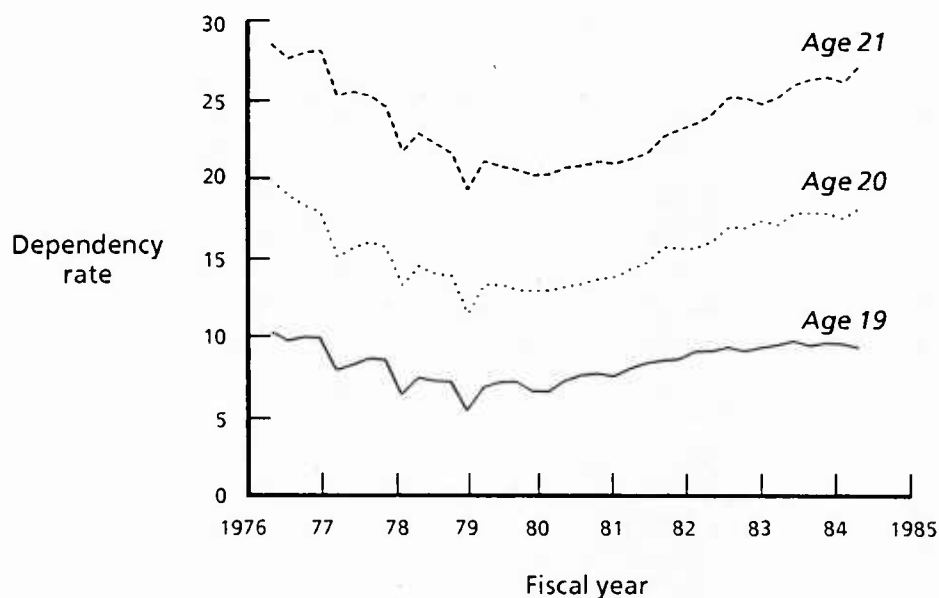

FIG. 2: ENLISTED DEPENDENCY RATES FOR ALL PAY GRADES

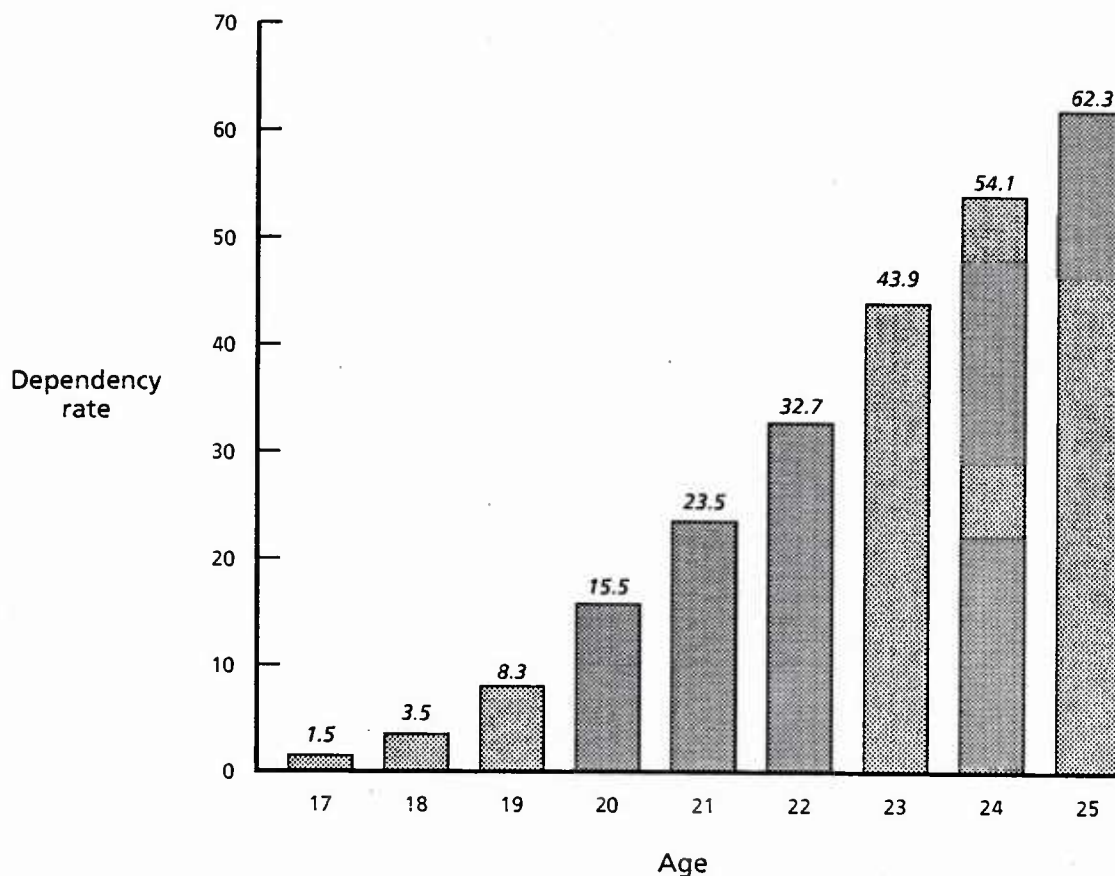

FIG. 3: DEPENDENCY RATES BY AGE

FIG. 4: AVERAGE DEPENDENCY RATES BY AGE

Comparing dependency rates for Marines to those for civilians and other service forces will shed some light on whether some other factors proposed as explanations are, in fact, determining factors. One reason proposed for the rise in dependency is demographic — that is, the rise in Marine dependency is part of an overall trend in the U.S. population. If this were true, civilian marriage rates could be a good indicator of Marine dependency rates. As shown in figure 6, however, the percentage of male civilians that are married has declined steadily in every age group since the early 1970s. Marital status for Marines has behaved very differently; figure 7 shows a direct comparison of the two populations.

One possible reason for the decline in the percentage of married civilians is the changing character of the population. The proportion of high school graduates in the U.S. population has climbed steadily since 1970. Since marriage rates tend to decline with education, the proportion married in a
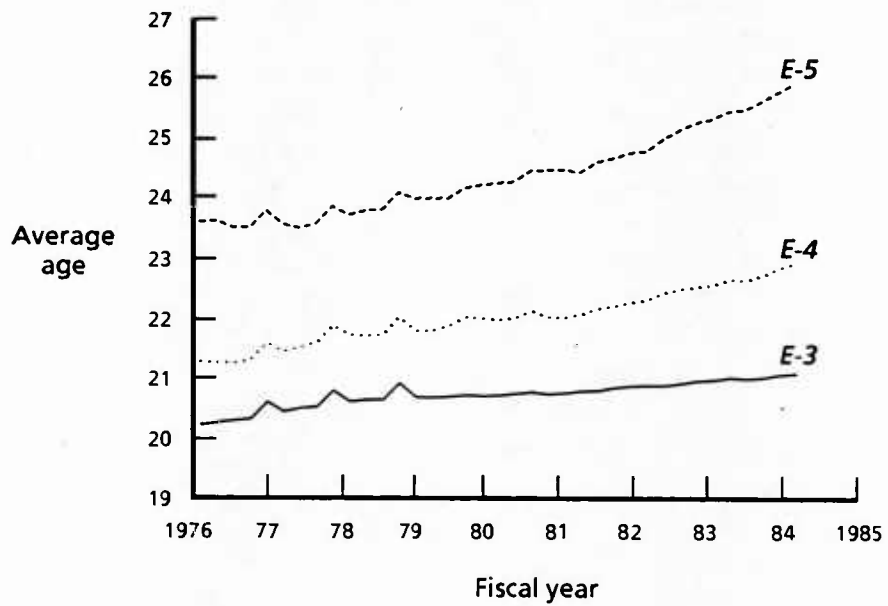
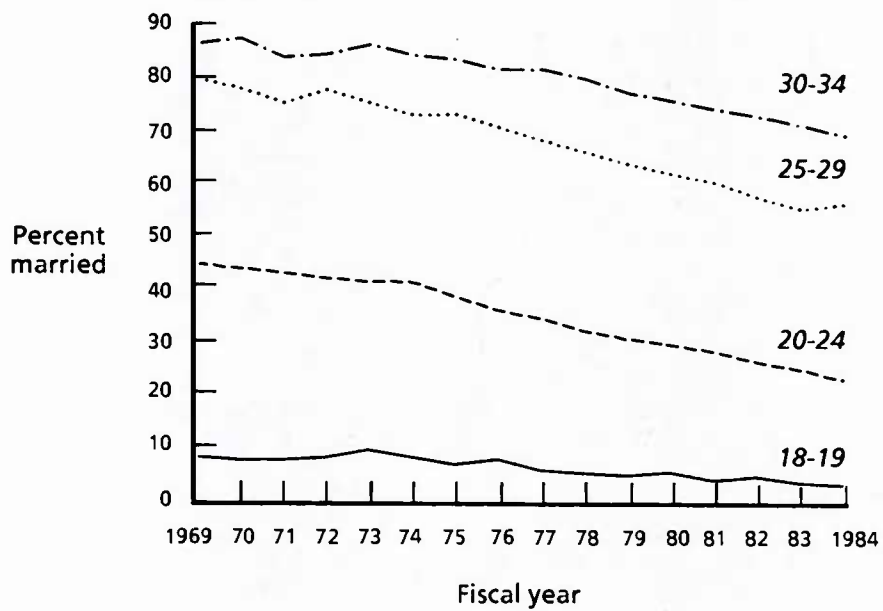**FIG. 5: AVERAGE AGE BY PAY GRADE**

FIG. 6: PERCENT MARRIED OF MALE CIVILIANS BY AGE GROUP

population with increasing education will drop, even if the underlying averages remain unchanged. Stated differently, the overall trend may decline due to shifts in the relative population weights, even though the marriage rates for different education levels are unchanged. Further analysis of the civilian data on marital status shows that, even when controlling for educational level, the percent married has dropped sharply. Data from the March 1976 Current Population Survey (CPS) and the May 1983 CPS (table 3), indicate that the proportion of male civilians not in school who are married has fallen at every age, in most cases by a sizeable amount. Although the percentage of married Marines in the same age groups also declined, the drop has not been nearly as great. It therefore appears that changes in the behavior of the U.S. population cannot explain the rise in Marine Corps marriage and dependency rates since 1980.
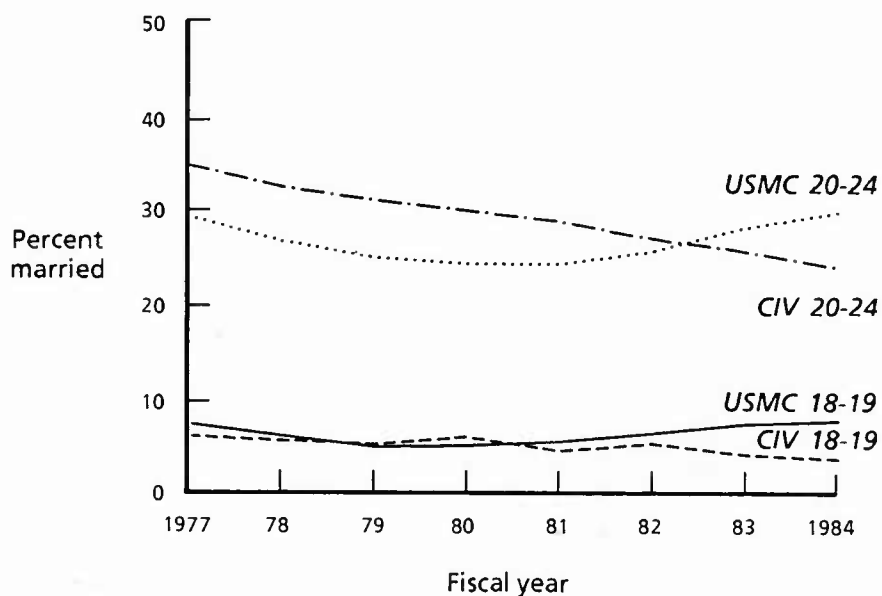
FIG. 7: PERCENT MARRIED OF ENLISTED MARINES
AND MALE CIVILIANS BY AGE GROUP

Figure 8 compares Marine dependency rates to Navy enlisted rates for the period 1977 to 1985. The overall patterns for both services are similar, and the rates for grades E-3 and E-4 have moved closer in recent years. The similarity in patterns between the Marine and Navy rates suggests that the same factors are influencing both groups. Thus, policies specific to the Marine Corps (such as the implementation of the Unit Deployment Program) can be eliminated as a major factor in the movement of dependency rates. This is not

to say that implementation of these policies has had no impact, but only that the effects are small and cannot explain much of the 9.5-point rise since 1980. Moreover, programs that started during the late 1970s cannot have been a factor in the initial high rates of dependency during the first few years the programs were in effect. Another explanation must be found.

TABLE 3

MARINES AND MALE CIVILIANS – PERCENT MARRIED

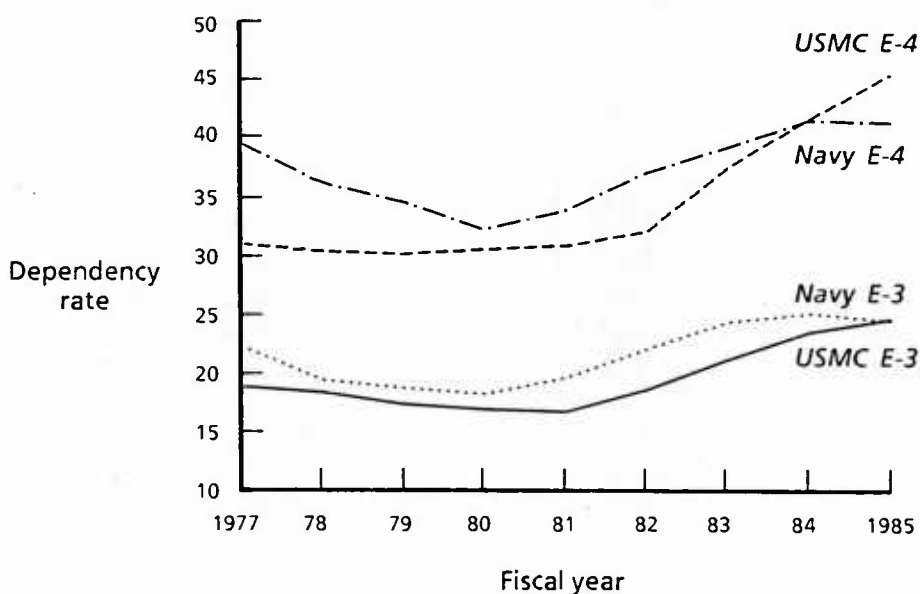| Age	Marines 1976	Male civilians 1976	Marines 1983	Male civilians 1983
18	4.8	6.5	4.7	2.7
19	10.0	16.0	9.2	5.0
20	19.1	28.0	16.1	12.5
21	27.3	35.0	24.1	16.8
22	37.4	47.4	33.3	27.4
23	48.6	54.6	43.3	40.3
24	58.2	65.9	53.4	44.2
25	66.5	70.6	61.6	46.5

FIG. 8: DEPENDENCY RATES FOR MARINE CORPS AND NAVY E-3 AND E-4

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The discussion so far has detected two factors in the rise of the overall dependency rate. A higher grade structure is one explanation for the higher rate of dependency (see table 2). The second, and more important reason, is the changing age distribution of the enlisted force. Changes in the age distribution alone account for about 63 percent of the rise in the aggregate dependency rate from 1980 to 1985. That is, if the dependency rate for each age had been the same in 1985 as in 1980, the change in the age distribution alone would explain 63 percent of the rise in the overall dependency rate during that time. These two factors cannot explain all of the increase, however, because there are still systematic variations in dependency rates within grade and age groups.

The single variable that is most closely correlated with dependency rates is military pay. In figure 9, an index[1] of military pay and allowances is superimposed on dependency rates for enlisted Marines aged 19 to 21. Although the correlation is not perfect, the general bowed shape of the curve for pay is similar to the curve for dependency. Other variables charted over a similar time frame might be correlated with dependency without the existence of a cause-and-effect relationship, but, for a number of reasons, the effect of pay on dependency seems plausible. First, an individual's present and future earnings will influence his or her decision to get married. Higher earnings are likely to increase the probability of marriage because a family will be more affordable. The severe income erosion suffered by military members in 1979 to 1981 must have caused some Marines to consider seriously whether they could afford to have a family or decide to delay marriage. As military incomes rise, marriage rates will probably return to approximately their former levels for each age group.

Moreover, economic studies have found that marriage rates are positively correlated to the business cycle.[2] As incomes rise above their trend values, more people get married. Members of the military are not directly influenced by the U.S. business climate, but the uncertainties of budget appropriations sometimes have a similar effect on the services. The fluctuations in military pay since the mid-1970s appear to have affected marital status among Marines in a pattern consistent with that previously observed for civilians.

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1. The index is composed of base pay and allowances for an E-4, deflated by the Consumer Price Index.
2. See, for example, Morris Silver, "Births, Marriages, and Business Cycles in the United States," *Journal of Political Economy*, 73 (Apr 1965): 237-255.
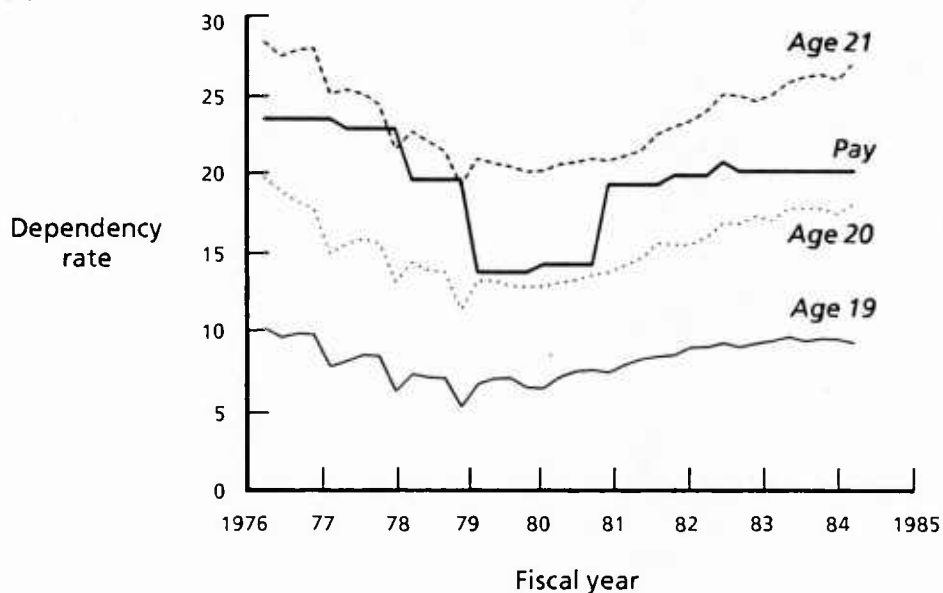
FIG. 9: MILITARY PAY INDEX AND ENLISTED DEPENDENCY RATES

STATISTICAL ANALYSIS

The three principal factors in determining the level of dependency rates that have been identified are grade, age, and pay. To evaluate the importance of these factors on the overall dependency rate, the analysis studies each grade separately, thereby controlling for differences in the grade structure. Within grades, the effects of age and pay are estimated by the use of statistical regression techniques. For budget projections, the predicted dependency rates for each pay grade are matched with the expected grade distribution of the enlisted force to get a prediction of the aggregate dependency rate.

The data used in the analysis are monthly dependency rates provided by Headquarters, Marine Corps. The data are available from October 1977 through June 1986. The data on dependency rates are supplemented by information on the age distribution within grades obtained from the Headquarters Master File (HMF). From the HMF, quarterly estimates of the average age for each grade were calculated and merged with the dependency rates. From the military pay tables, an index of real (adjusted for inflation) pay and allowances was constructed and merged with the other data.

Preliminary investigation showed that although changes in pay and average age explain most of the fluctuations in dependency within grade since

1978, a significant increase was still unexplained. Based on those findings, the original model was modified to include a time trend designed to capture the upward movement in dependency rates that is independent of changes in pay and age. As is common in time series data of this type, the rates exhibit a significant amount of autocorrelation, so the estimation procedure was adjusted to correct for it.

The approach taken here is to model the dependency rate process as consisting of three parts: a structural component, a trend component, and a random component. The structural component consists of the effects of pay and age. The trend component is modeled as a simple linear trend, in which the dependency rate goes up or down by the same amount each month. The random component contains the unexplained residual after the other two components are controlled for. After some examination, the random component was determined to be autocorrelated. This means that the residual in one period is systematically related to the residuals in previous periods.

The regression equation used in the analysis is

$$Dependency_i = a_1 + a_2 Average\,Age_i + a_3 Pay\,Index_i + a_4 Time + e_i \ .$$

The error term e_i, is assumed to follow a first-order autoregressive process, with .

$$e_i = \mu_i + \rho e_{i-1}$$

in which ρ is the autocorrelation parameter.

The coefficient a_2 is an estimate of the change in the dependency rate resulting from a change in the average age within a pay grade. If, for example, the average age rose from 22.1 to 22.2, the dependency rate would be predicted to rise by 0.1 times a_2. Similarly, a_3 estimates the effect of a change in the pay index, and a_4 gives the predicted increase or decrease in the rate each month that is due to the trend component.

The results of the analysis are shown in table 4. Pay grades E-7 through E-9 have not shown much variation in dependency during the last several years, so the statistical analysis did not find any significant relationships with the explanatory variables. Consequently, those grades are not included in the regression results. The other grades demonstrate sizeable differences in sensitivity to the explanatory variables.

TABLE 4

REGRESSION RESULTS FOR DEPENDENCY RATES

Grade	Constant	Pay index	Average age	Time trend	R^2
E-1	− 8.80 (0.82)	0.168 (0.02)	0.08 (1.63)	0.01 (0.59)	.824
E-2	− 23.80 (1.85)	10.24 (2.66)	1.12 (1.76)	0.03 (4.50)	.953
E-3	− 2.91 (0.22)	7.17 (1.78)	0.59 (0.83)	0.07 (7.73)	.988
E-4	− 90.37 (3.14)	24.80 (3.34)	4.28 (3.13)	0.10 (5.45)	.983
E-5	− 238.28 (13.05)	9.08 (2.07)	12.20 (14.68)	-0.16 (7.81)	.974
E-6	37.85 (4.92)	− 0.65 (0.36)	1.79 (6.99)	-0.03 (5.17)	.850

NOTE: All regressions contain 104 observations. Absolute value of t-statistics in parentheses.

Grade E-1 shows little variation due to pay or age changes, and most of the explanatory power of the model is due to the autocorrelation process. This indicates that the dependency rates for this pay grade are mostly a random process that can be approximated by a random walk. For grades E-2 and E-3, there is a strong response to pay changes and a positive trend component but no statistically significant impact of age changes. Starting with grades E-4 and through E-6, the effect of average age is strong, especially for grade E-5. The coefficient on average age for sergeants is 12.2, which means that an increase of 1 year in average age will cause a rise of 12.2 points in the dependency rate. To put this effect into perspective, the increase in the average age within grade E-5 from 1980 to 1985 was 1.64, which implies a 20-point rise in the dependency rate for sergeants. The actual increase was only 11, with the difference primarily due to the negative trend. The model predicts that between 1980 and 1985, the 6-percent change in the pay index should have increased the dependency rate by 0.5 points (9.08 × 0.06), and the time trend

should have decreased it by 9.6 points (-0.16×60 months), for a net increase of 10.9, which is close to the actual increase of 11 points.

An interesting aspect of the results shown in table 4 is the negative trend coefficient for grades E-5 and E-6. Grades E-2 through E-4 all have significant positive trends. The declining trend for older Marines is consistent with the general civilian population, but changes in pay and age have caused the dependency rate to rise. At current rates of increase in the average age of sergeants, the dependency rate should continue to rise, but if the increase in average age levels off, the rates should begin to fall.

PROJECTIONS OF DEPENDENCY RATES

The analysis presented in the previous section examined some of the factors that influence the level of dependency rates. To use those results in making predictions, it is also necessary to develop a method for predicting future changes in pay and average age. Pay changes are relatively easy to predict, at least in the short term, because of the detailed legislative discussion that occurs before pay increases take effect.

The problem of predicting changes in the average age of Marines is more difficult because there are several factors influencing this trend, as well as the more general difficulty of predicting human behavior. Rather than develop a complex, detailed model for projecting the age distribution of the enlisted force, a simple trend model is used. A more complicated approach would involve the analysis of reenlistment behavior as well as changes in the demographic composition of the enlisted force, which is likely to add greater complexity and uncertainty without giving much more precision (and possibly less) in explanatory power. As figure 5 shows, the increase in the average age within pay grades has been steady and systematic during the last several years and can be closely approximated by a linear trend.

For these reasons, the dependency rate predictions are based on a straight-line projection of the historical movements in the average age of Marines within pay grades. The linear trend is estimated using quarterly data on average age for each grade by the regression equation

$$Average\ Age_t = b_1 + b_2\ Time_t .$$

The coefficient b_2 gives the estimated change in average age during each quarter. The results of this analysis are shown in table 5, which lists the regression coefficients for grades E-1 through E-6. The estimated coefficients

of b_2 act as the predicted change in average age and are used in the dependency rate regression model to predict future values of the dependency rate. For example, in table 5 the estimated value of b_2 for grade E-4 is 0.039, which means that the average age of Marine corporals is expected to increase by 0.039 year per quarter, or 0.013 per month, based on historical trends.

Table 4 shows that the effect of average age on the monthly dependency rate for grade E-4 is 4.28. Therefore, the expected rise in the monthly dependency rate due to increases in average age is $(4.28 \times 0.013) = 0.056$ point. At the same time, the trend component of the model predicts that the monthly dependency rate will rise by 0.10 point per month, for a total increase of 0.156 point. Based on these estimates, this rate of increase is predicted to continue indefinitely, although it would reasonably be expected that the increases in average age, as well as any positive trend, should, at the least, level off. The model does not demonstrate this statistically, however, and attempts to incorporate a quadratic trend yielded increases in dependency rates that would give implausibly high predictions within only a few years. That model was rejected as being unreasonable, as well as unlikely, since the Marine Corps will probably not tolerate such a high proportion of older personnel or Marines with dependents.

TABLE 5

REGRESSION RESULTS FOR AVERAGE AGE

Grade	Constant	Time trend	R^2
E-1	19.04 (310.2)	0.019 (6.14)	.533
E-2	19.59 (677.5)	0.012 (8.36)	.679
E-3	20.56 (908.0)	0.014 (12.3)	.821
E-4	21.51 (658.4)	0.039 (23.7)	.945
E-5	23.36 (490.9)	0.074 (30.8)	.967
E-6	27.92 (488.3)	0.055 (19.0)	.917

NOTE: All regressions contain 35 observations. Absolute value of t-statistics in parentheses.

Based on the estimates presented in tables 4 and 5, table 6 shows the projected monthly dependency rates for grades E-1 through E-6. The important assumptions underlying the predictions are:

- The military pay index will remain unchanged from its current level.

- The average age within pay grades will grow at the historical rates estimated in table 5.

- The trend growth in dependency rates will be unchanged from the rates estimated in table 4.

The predictions can be modified easily for any changes in the underlying assumptions.

The projections use the most recent dependency rate data available (July 1986) as the base case. Changes to the base are derived from the coefficients listed in tables 4 and 5 and extrapolated into the future. For example, for pay grade E-3, the July 1986 dependency rate was 24.80. As seen in table 4, the trend rise in the monthly dependency rate is expected to be 0.07 point. Table 5 shows that the expected quarterly change in average age is 0.014; that number is divided by three to get an estimate of the monthly change. From table 4, the coefficient on average age is 0.59, which implies that the monthly increase in dependency due to changes in average age is 0.0027 (0.014 × 0.33 × 0.59). The net monthly increase in the dependency rate for pay grade E-3 is then 0.0727, with a predicted rate for August of 24.87. The projections for the other pay grades are calculated in an identical manner.

The predicted monthly dependency rates, by pay grade, are shown in table 6. It shows a continued rise in the rates for each grade, although at rates lower than experienced in the last year. It is assumed that the dependency rates for grades E-7 through E-9 will remain at their current levels.

The projected growth in dependency rates during the next 3 fiscal years varies a great deal among the different pay grades. Grade E-1 is expected to grow only slightly, i.e., 0.18 point by the end of FY 1987. Grades E-2 and E-3 are predicted to rise by 0.42 and 0.98 point, respectively, during the same period. The increases for pay grades E-4 and E-5 are larger, with a 2.3-point rise for corporals and a 1.92-point jump for sergeants. The expected increase for grade E-6 is negligible.

TABLE 6

PREDICTED MONTHLY DEPENDENCY RATES

Month	E-1	E-2	E-3	E-4	E-5	E-6
8608	5.68	9.23	24.87	46.54	72.76	88.35
8609	5.70	9.26	24.94	46.71	72.89	88.35
8610	5.71	9.29	25.01	46.87	73.03	88.36
8611	5.72	9.32	25.08	47.04	73.17	88.36
8612	5.73	9.35	25.15	47.20	73.31	88.37
8701	5.75	9.38	25.22	47.36	73.44	88.38
8702	5.76	9.41	25.29	47.53	73.58	88.38
8703	5.77	9.44	25.36	47.69	73.72	88.39
8704	5.78	9.47	25.43	47.86	73.85	88.40
8705	5.80	9.50	25.50	48.02	73.99	88.40
8706	5.81	9.53	25.57	48.19	74.13	88.41
8707	5.82	9.56	25.64	48.35	74.26	88.41
8708	5.84	9.59	25.71	48.51	74.40	88.42
8709	5.85	9.62	25.78	48.68	74.54	88.43
8710	5.86	9.65	25.85	48.84	74.68	88.43
8711	5.87	9.68	25.92	49.01	74.81	88.44
8712	5.89	9.71	25.99	49.17	74.95	88.45
8801	5.90	9.74	26.06	49.33	75.09	88.45
8802	5.91	9.77	26.13	49.50	75.22	88.46
8803	5.92	9.80	26.20	49.66	75.36	88.46
8804	5.94	9.83	26.27	49.83	75.50	88.47
8805	5.95	9.86	26.34	49.99	75.63	88.48
8806	5.96	9.89	26.41	50.16	75.77	88.48
8807	5.98	9.91	26.48	50.32	75.91	88.49
8808	5.99	9.94	26.55	50.48	76.05	88.50
8809	6.00	9.97	26.62	50.65	76.18	88.50
8810	6.01	10.00	26.69	50.81	76.32	88.51
8811	6.03	10.03	26.76	50.98	76.46	88.51
8812	6.04	10.06	26.83	51.14	76.59	88.52
8901	6.05	10.09	26.90	51.30	76.73	88.53
8902	6.06	10.12	26.97	51.47	76.87	88.53
8903	6.08	10.15	27.04	51.63	77.01	88.54
8904	6.09	10.18	27.11	51.80	77.14	88.55
8905	6.10	10.21	27.18	51.96	77.28	88.55
8906	6.12	10.24	27.25	52.12	77.42	88.56
8907	6.13	10.27	27.32	52.29	77.55	88.56
8908	6.14	10.30	27.39	52.45	77.69	88.57
8909	6.15	10.33	27.46	52.62	77.83	88.58

Pay grades above E-6 are unaffected by changes in age or pay, primarily because their dependency rates are already so high. Those pay grades do not exhibit any trend either, so their expected future rates are predicted to be the same as current rates.

DISCUSSION

The projected dependency rates shown in table 6 are based on a straight-forward extrapolation of recent trends. One difficulty with this approach is that the simple extension of historical behavior cannot detect changes in those trends. Although there is no firm evidence that the rise in dependency is slowing down, presumably it must slacken off at some time in the future. The key issue is the level at which dependency rates will flatten out. The answer does not appear in the statistical analysis, which shows no reduction in the overall rates of growth in dependency. In addition, the main factor in the recent rise in the dependency rate, the aging of the enlisted force, shows no change whatsoever in recent trends (figure 5). Two factors, however, provide some qualitative evidence on the ultimate limit to the rise in dependency rates.

The first factor is the increasing age of the Marine Corps enlisted force. Figure 5 shows a steady, and at times accelerating, growth in the average age of Marines in the most common pay grades. The more rapid growth in the last few years is directly attributable to higher retention rates within the middle pay grades. Even if retention remains high, the shift in the age distribution of Marines will gradually subside and stabilize, because it is the change in retention (among other factors) that causes the shift. Once that stability occurs, the most important determinant of the rise in dependency rates will be eliminated. This process, however, is likely to take several years because the effects of high retention continue to persist over a span of several years. Reenlistment "locks in" Marines for a sustained period of time (usually 4 years), during which they age and are more likely to have dependents.

If and when the age distribution stabilizes, the principal concern will be changing rates for specific age categories. As shown in figure 3, the dependency rate has risen for every age since 1980, but here, too, there is reason to believe that the rates will level off in the next few years. Table 3 and figure 3 demonstrate that the percentage of Marines who are married is actually lower now than in the 1970s. So although the rise in recent years appears alarming, the overall picture is still generally consistent with the decline in civilian marital status during the same time frame. The civilian rates do show a much

greater drop, but it is difficult to believe that the Marine Corps (and the other military services as well) will persist indefinitely in going the opposite direction from what is a very strong demographic trend. Behavioral differences between Marines and civilians are unlikely to be so large that the fundamental characteristics of the two populations can move in contrary directions for very long.

This conclusion does not claim that members of the military and their civilian counterparts cannot have different marriage rates, but only that the general trends should not vary too greatly over long periods of time. This will be particularly true during the next decade, when the declining youth population will require higher rates of participation in the military. Out of necessity, then, the two groups must become more alike, not less. It is also difficult to believe that the percentage of Marines who are married can continue to grow and eventually exceed the percentages of the 1970s, while the civilian rates for comparable age groups have fallen during the same time.

This rather extended discussion suggests that enlisted dependency rates may begin to level off in the next few years. Although this is uncertain, close monitoring of the rates may illuminate some shifts in behavior. The model presented in this memorandum is adaptable to changes in the underlying trends, as well as being flexible to variations in the trend changes in average age and pay raises. These variables should be followed carefully, and any changes incorporated into the forecasting model.